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ABSTRACT

The results of a national census are too often viewed as of little use except for allocating seats in the House of Representatives of the U.S. Congress. This essay argues that a broader view of census data should be taken; the data can prove valuable for instructional use across the secondary school curriculum. An overview of population education is provided, as well as examples of ways in which secondary schools are incorporating demographics into their instructional programs. A list of agencies and organizations that produce information and materials for population education is included. (DB)

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By the Numbers:

Population Studies and the Curriculum

(Curriculum Report Vol.20 No. 2 November 1990)

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By the Numbers: Population Studies and the Curriculum

The results of the 1990 national census may provide valuable data for instructional use across the curriculum in our schools.

A majority of Americans are likely to view this year's national population counting as little more than another expensive governmental bother, of little use except for allocating seats in the House of Representatives, and not worth serious attention by schools and curriculum developers.

This limited view of a national census—our own and other countries' as well—biases our understanding of many of our nation's problems and distorts our judgments about the conditions of other people around the globe. American young people and their teachers are known and respected internationally for their ready and generous responses to calls for help from the needy wherever they may be, but the focus of these responses could be made sharper and their effects longer lasting by enlarging the demographic content of secondary school instruction and correcting some of our customary perspectives of the human condition and what influences it.

Why the Counting, Anyway?

April 1, 1990, marked a special anniversary: the bicentennial of the U.S. census of population. This invaluable "fact finder for the nation" was first taken in 1790, when the nation's population numbered fewer than 4 million people residing in some 500,000 households.

When preliminary data are presented to the president by December 31, 1990, it is anticipated that about 250 million people, occupying some 106 million housing units, will have been counted. The enormous task of enumerating the nation's population will have cost nearly $3 billion, and employed 8,500 full-time and 500,000 part-time staff members.

Why do the United States and many other countries undertake such a costly and time-consuming endeavor? In the United States, Article 1, Section 2 of the Constitution mandates a decennial census for apportioning by population the 435 congressional seats in the House of Representatives. Providing data for legislative reapportionment, however, is but one of many invaluable benefits of the census. For example, allocation of nearly $40 billion in federal grants to states and local jurisdictions each year depends on the census.

For this nation and others, a census is the single most important source of demographic, social, and economic information. Sociologist Kingsley Davis pinpoints the many uses of census data:

> The population census is probably the most prolific and fundamental source of information about a nation. . . . It reveals not only the basic demo-

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graphic trends, such as population growth, internal redistribution, urbanization and alterations in the age and sex structure, but also contributes indispensably to a knowledge of changes in the nation's occupational and industrial composition, in its level of living, education and employment.... Above all, the census makes possible the estimation of future trends and is therefore essential to all kinds of planning: national, local, public, and private. It is essential for knowing future military and economic manpower potentials, future consumer needs, forthcoming school requirements, future growth in metropolitan areas, potential costs of social security measures, future requirements for highways, utilities, parks, water, energy, and health services. (*Population Bulletin*, May 1969, pp. 27-28)

Census Data and Instruction

Population education is highly interdisciplinary. Its link with the social and natural sciences, as well as global and environmental education, is highlighted in the following definition:

> Population education is the process of developing knowledge, understanding, values, and attitudes concerning population phenomena and their effect on the quality of life. It seeks to build an effective awareness of the human dimensions of the world's people living together on a finite globe—an awareness of how the individual affects, and is in turn affected by, population processes. (Federal Interagency Committee on Education, 1976, p. 1)

Nearly all population education begins with census data in some form. For educators, census-derived information constitutes a rich resource with vast diversity of application for instructional use.

Numbers of inhabitants (by state, county, urban, rural, or other geographical distributions) are but one of many categories of information of interest to educators. Other useful data include such subjects as national origin, race, and ethnicity; geographic distribution of the population by numerous divisions and categories; education, employment, occupation, industry, and income; marital status, families, and fertility; migration patterns and trends; and varied details of housing.

Applications of census data to classroom teaching are unlimited. Demography, sociology, economics, anthropology, political science, and other social sciences depend heavily upon census data. History and geography, too, draw heavily from temporal and spatial analyses of demographic information. Such natural sciences as biology, ecology, and hydrology are deeply concerned with global environments and Earth's human "carrying capacity."

Because census data are quite readily available and so diverse in their topical nature, they are applicable to nearly any course in the curriculum. Currently, population study is most often integrated into social studies courses. It may be treated as a current events issue, as an aspect of citizenship, or as a problem confronting humankind.

History courses are most apt to focus on historical patterns of population, such as migrations, urbanization, the role of frontiers, and conflicts triggered by competition for space and resources.

In geography courses, population often is presented as a chapter or unit with emphasis on patterns of distribution, problems resulting from "overpopulation," and such related issues as resource consumption and environmental pollution.

Because of their nature and relevance, population data and issues lend themselves to numerous other instructional settings:

- Mathematics lessons can be developed using population statistics;
- A vast and varied body of literature on population issues is available and ideally suited for use in English and other language arts courses;
- Home economics and other courses that stress family and civic responsibility constitute an ideal forum in which to address many demographic issues.

Population Data, Decisions

Important as it is for high schoolers to understand the local and national significance of the numbers accumulated by the U.S. Census, their understanding cannot be comprehensive unless these data are studied in a more global context.

Famine once again stalks Ethiopia. Severe drought has threatened massive cutbacks in southern California's water use. Festering urban slums, rising crime rates, seemingly insurmountable foreign debt, chronic political instability in many Third World countries, the abortion issue factionalizing our society—these crises and countless others share a common denominator: each is population-related.

As the global population expands well beyond 5 billion, earth's ecosystems and natural resources, including life-giving air, water, and soil are pressed to their limits. Agricultural production fails to keep pace with population growth in many parts of the world. Growing at an annual rate of 1.8 percent, the current population of approximately 5.325 billion will grow by more than 95 million during 1990. Today's secondary school students can expect to experience a global population—and accompanying global problems—of some 11 billion people before

WORLD POPULATION DATA*

(April 1990 est.)

World: 5,321,000,000 (1.8% annual gain; increase of 94 million from 1989)

Rate of Increase: 1.8% (projects to net gain of 96 million in 1990)

1960	1.7% of 3.2	billion	=	55	million/year	(42	years/double)	
1972	2.0% of 3.8	"	=	76	" "	(35	" "	)
1977	1.9% of 4.1	"	=	78	" "	(41	" "	)
1979	1.7% of 4.3	"	=	73	" "	(41	" "	)
1986	1.7% of 5.0	"	=	84	" "	(41	" "	)
1989	1.8% of 5.2	"	=	94	" "	(39	" "	)
1990	1.8% of 5.3	"	=	96	" "	(39	" "	)

Net growth (1990)		Population of Comparable Regions
3	per second	
182	per minute	(small hamlet)
10,959	per hour	(small city)
263,013	per day	(combined population of South Dakota's 5 largest cities)
1,846,154	per week	(Minneapolis-St. Paul metropolitan area)
8,000,000	per month	(Chicago metropolitan area)
96,000,000	per year	(more than Mexico, world's 11th ranking country)

Population by Continent:		Annual Growth	Population/ sq. mi.	GNP/ per cap
Asia	3,116,000,000	1.9%	179	$ 1,430
Europe	700,000,000	.3%	182	12,170
Africa	661,000,000	2.9%	57	600
U.S. & Canada	430,000,000	.7%	37	19,490
Mid. & S.America	295,000,000	2.1%	55	1,930
Australia	17,000,000	.8%	5	12,390

Population by Country (Top 10):

(1)	China	1,120,000,000	1.4%	232	$ 330
(2)	India	853,000,000	2.3%	689	330
(3)	Soviet Union	290,000,000	.9%	34	8,375
(4)	United States	251,000,000	.8%	68	19,780
(5)	Indonesia	189,000,000	1.8%	255	430
(6)	Brazil	150,000,000	1.9%	46	2,280
(7)	Japan	124,000,000	.4%	850	21,040
(8)	Nigeria	119,000,000	2.9%	334	290
(9)	Bangladesh	114,800,000	2.5%	2,067	170
(10)	Pakistan	114,700,000	3.0%	335	350
	WORLD	5,321,000,000	1.8%	92	3,470

*Adapted by Charles F. Gritzner from *1990 World Population Data Sheet*, Population Reference Bureau, Inc., 777 14th St., NW, Washington, DC 20005.

they reach the age of 50.

Providing adequate food, space, educational opportunities, shelter, medical care, and employment for a rapidly growing population imposes an insurmountable burden for many countries.

Considering the high population growth rates throughout much of the world, it seems unlikely thatglobal, or most regional economies will be able to keep pace with the exploding population. The concept of "overpopulation" and its many related problems constitute a timely and relevant subject demanding thoughtful classroom attention.

Not Just Numbers

Population study is rich in opportunity for introducing and developing a host of related concepts, many of which are value-laden as well.

■ *Overpopulation.* Few conditions are more difficult to define than that of overpopulation. Often, the concept is used in reference to places having a dense population; that is, as a synonym for overcrowding.

Europe has the highest population density of any continent, yet, by nearly any measure (factors such as per capita gross national product, life expectancy, literacy, and per capita consumption of resources), the well-being of Europeans far exceeds that of most other peoples. Is the continent overpopulated?

Parts of Africa's Sahel region, on the other hand, have fewer than five persons per square mile, yet are subject to immense human deprivation and suffering.

There is no widely accepted definition of overpopulation. The following definition suggests the complex nature of the concept including chief variables (underlined):

> Overpopulation is a condition achieved when the human population exceeds the capacity of available and resources to adequately provide the essential elements of survival under existing social, political and economic conditions.

In an increasingly intradependent global society, students should be made aware of the many conditions that lead to overpopulation and its attendant conditions of human suffering. They also must recognize that numbers of people alone do not necessarily constitute a population problem.

■ *Environmental Carrying Capacity.* Many students of population are tempted to apply a grazing-land concept to humans and the varied environments they occupy. People, however, do not relate to the environment in the same manner as livestock. Each human culture brings to bear its own unique perceptions of the land it occupies and to the resources available within its environment. Each culture also has its own identified needs, aspirations, technology, and capital resources.

Japan is an excellent case in point. Small, highly fragmented, mountainous, and generally lacking in agricultural land and industrial resources, the country still has become a major economic power and its people enjoy a very high standard of living. The chief Japanese resource is its people; nearly all raw materials and natural resources for its industries must be imported.

■ *Cultural Ecology.* A fundamental aspect of life is the inescapable fact that *people occupy space, people consume resources and raw materials,* and *people contribute to pollution and other types of environmental alteration.* These relationships between humans, functioning as cultural agents, and the natural environments they occupy is cultural ecology. It is tempting to suggest that the greater the human population, the more space must be occupied, more resources and raw materials must be consumed, and more environmental degradation will occur. In the global context, however, there seems to be little relationship between population numbers and negative environmental change.

Some cultures nurture their surroundings, whereas others are highly destructive; some peoples consume very few resources, while others consume disproportionately. (The United States, for example, with about 6 percent of the world's population, is said to consume some 30 to 40 percent of all metals and fuels.)

Students should recognize the role of humans as both occupiers of space and consumers of resources and the character of their cultures (economic system, land use practices, environmental ethic, technology, etc.) in determining the degree to which a people live in relative harmony with nature.

■ *Occupied Space.* If Earth's more than five billion people stood together in a tightly clustered group, with each individual occupying about three square feet, we would cover an area of less than 600 square miles (a square measuring about 25 miles to a side). Yet nearly everywhere, Earth appears to carry the indelible imprint of human population and activity.

The concept of occupied space is a complex variable that must be considered from at least three conditions:

1. *Personal space,* which is defined as the immediate area occupied by an individual. Basically, this is fairly constant from culture to culture and is a requirement that is determined by the population itself.
2. *Functioning space,* a second category of areal occupancy, includes the space in which an individual lives, works, and otherwise functions on a normal basis. Some societies and individuals within societies require vast areas for their regular habitation and work, while others require very little space.
3. *Provisioning space* is the area from which all materials and services used by an individual are produced or derived. Culturally speaking, provisioning space is the most variable of the three. For example, the average American citizen literally has many acres of land pro-

ducing food, fiber, energy, and other perceived needs, whereas people living in a traditional society such as hunters, fishers, and gatherers, may leave almost no lasting imprint on the land.

■ *Settlement Frontiers.* The human population, when viewed on a map of population distribution, appears to be quite tightly clustered. Indeed, some 90 percent of humankind inhabits but a small fraction of the globe (estimated to be about 10 percent). Vast areas of the map appear as areas of low density. Often, these settlement frontiers are thought of as being "too lands"—places too hot, too cold, too dry, too wet, or too rugged for easy human habitation.

On more careful scrutiny, however, for every "too land" supporting a low population density, a comparable area is home to a great many. Examples include: the Amazon Basin vs. Indonesia and Nigeria; much of Canada vs. Europe and the Soviet Union at comparable latitudes; the Sahara Desert vs. the "Sunbelt" of the southwestern United States.

Vast areas of Earth's surface remain to be settled and developed effectively. In regard to the successful settlement of such lands, the words of Mao tse Tung ring very true: "There are no unproductive regions; there are only unproductive people."

Population Knowledge Essential

"Population" in its various forms is a requisite for the study of any and all of the social studies at the secondary school level and beyond. But more than that, the facts and concepts that population study produces add to the breadth and depth of study of other disciplines as well.

A classroom discussion of Grapes of Wrath must consider various populations and their sources and impacts; students in Distributive Ed must learn how to determine what this year's population of seniors want in a pair of blue jeans that last year's 12th graders wouldn't be caught dead in; and agriculture students will be studying the nature of the market for American grains in various corners of the globe, all of which is basically an examination of differing populations.

Wherever one looks in the school curriculum, knowledge of populations, their construction and relevance, is a critical and essential teaching/learning element. The infusion of an adequate supply of population information and concepts suitably organized and interpreted deserves serious attention by curriculum designers and teachers.

Exempli Gratia

The following are a few examples of the ways in which secondary schools are incorporating demographics into their instructional programs.

■ ANNE ARUNDEL COUNTY PUBLIC SCHOOLS, 2644 Riva Rd., Annapolis, Md. 21401. *Contact:* James F. Adomais.

Demographic understanding is taught as part of the regular curriculum in such courses as American history, contemporary world history, sociology, world geography, and seventh grade cultural geography.

Charts, films, and filmstrips offer a rich overview of population studies. Some of the county's schools subscribe to materials supplied by the Population Reference Bureau and use the world maps, charts, and illustrations available from that source.

A study of population is also an important component of a futuristics course designed for gifted and talented seventh and eighth graders. In this course, students make population projections for the school system and the state.

■ REEDER SCHOOL DISTRICT NO. 3, Reeder, N.Dak. 58649. *Contact:* Roland P. Steen.

The physical science curriculum in Reeder schools includes a unit on world population and its growth. Its main objectives are to develop an understanding of a nation meeting the needs of the people, balancing resource utilization, and population's effect on the world.

As a part of the curriculum, a simulation has been developed to promote demographic understanding. The students select units of people, food, resources, energy, and land ranging from 10 to 100 units. They must provide the number of people they've chosen with enough units of food, land, and energy to allow the people a fair standard of living. They can trade units and form blocks of nations for mutual aid and protection.

■ PITTSVILLE HIGH SCHOOL, Box C, Pittsville, Wis. 54466, *Contact:* Charles Soper.

A five-week course on population is offered by Pittsville High School. The book *Population Bomb* by Paul Ehrlich is a source of lecture notes. Articles from other sources are used as supplementary readings.

A simulation game called BALDICER by Education Manpower, Inc., has been used very successfully. It is a powerful game that deals with the effects of global starvation. A film by Multimedia titled Population Debate also helps students develop insight into the dynamics created by our expanding global population.

■ DUNBAR MIDDLE SCHOOL, Ft. Worth Independent School Dist., 2501 Stallcup Rd., Ft. Worth, Tex. 76119. Contact: Doris Taylor.

In the 6th and 8th grades at Dunbar Middle School, the

science class addresses the teaching of world population in several ways. One activity involves food distribution using a loaf of French bread. Two loaves are unequally divided among groups of students representing five different continents. The students are asked to identify some of the major world problems resulting from overpopulation and unequal food distribution (i.e. malnutrition, starvation, crime, war, etc.).

The study is closed with the five-minute film *World Population,* which shows a timeline and yellow dots which each appear as another million people are added to the world population. The students gain an understanding that many of the world's problems have fewer solutions as the population continues to increase.

WILMINGTON FRIENDS SCHOOL, Wilmington, Del. 19803. *Contact*: James H. Hammond.

Wilmington Friends teaches demographic concepts using a variety of methods and materials, including assigned readings, class discussions, and student projects. The staff stresses the idea that people are members of groups, shapers of history, consumers, and so on. The program also stresses the idea that the decisions we make today affect other peoples and the future.

A unit in sociology focuses on population-change theory, using the *Social Graphics* poster and manual. This course involves students in an extended case study of groups in conflict. A project on social change in South Africa resulted in a symposium in which students presented papers to people in and outside the class.

In the future, the school hopes to incorporate more demographic concepts in its social studies courses such as world history and European history. A core history curriculum will use case studies and simulation to involve students in using social science concepts in their study of history. On-line searching and using computerized databases are two methods to be used for accessing demographic information.

Other Sources

Numerous agencies and organizations, both public and private, produce information and materials for population education. Any list, therefore, must be highly selective. The six sources listed below are perhaps the most respected and diversified in terms of services and materials made available to educators. Since each of these agents has a considerable variety and number of services, it is recommended that interested educators contact them for further information.

U.S. Bureau of the Census
Census Education Project
Decennial Planning Division
Washington, D.C. 20233
(301) 763-4358

ERIC/SMEAC
1200 Chambers Rd.
Columbus, Ohio 43212
(614) 422-6717

The Population Reference Bureau, Inc.
777 14th St., NW, Suite 800
Washington, D.C. 20036
(202) 639-8040

Worldwatch Institute
1776 Mass. Ave. NW
Washington, D.C. 20005
(202) 452-1999

Population Crisis Committee
1120 19th St., NW
Washington, D.C. 20036
(202) 659-1833

Zero Population Growth
1601 Conn. Ave., NW
Washington, D.C.20009
(202) 332-2200

Kudos

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